CLAIMS

What is claimed is:

1. In a method for testing predetermined absorbency characteristics of a textile, paper or similar material sample including the steps of: (1) providing a liquid reservoir mounted on an electronic balance or load cell; (2) providing a vertically movable test plate for the material sample and a liquid conduit between the liquid reservoir and the test plate; and (3) analyzing liquid absorbency and/or desorbency with a computer operatively connected to the electronic balance or load cell; the improvement comprising:
   (a) recording images of the liquid on the material sample with a camera mounted above the test plate and operatively connected to the computer; and
   (b) analyzing the recorded images with the computer to make real time determinations of selected properties of liquid absorbency and/or desorbency of the textile material sample.

2. In a method for testing predetermined absorbency characteristics of a material sample according the claim 1 including providing a hollow test plate with a liquid conducting cylinder in the middle of the test plate for supporting the material sample thereon.

3. In a method for testing predetermined absorbency characteristics of a material sample according to claim 2 including providing a hoop element textile material sample holder adapted to fit onto the hollow test plate.

4. In a method for testing predetermined absorbency characteristics of a material sample according to claim 1 including testing a nonwoven fabric.

5. In a method for testing predetermined absorbency characteristics of a material sample according to claim 1 including maintaining a constant head pressure on the liquid by lowering the test plate as the liquid in the liquid reservoir decreases and calculating the orientation distribution function (ODF) of the recorded images.

6. In a method for testing predetermined absorbency characteristics of a textile material sample according to claim 5 including using a Fast Fourier Transform (FFT) to calculate the ODF of the recorded images.

7. In a method for testing predetermined absorbency characteristics of a material sample according to claim 1 including raising the test plate relative to the liquid reservoir to a selected vertical position to achieve a predetermined pressure and analyzing the recorded images to calculate desorbency characteristics of the material sample.

8. In a method for testing predetermined absorbency characteristics of a material sample according to claim 7 including calculating the orientation distribution function (ODF) of the recorded images.

9. In a method for testing predetermined absorbency characteristics of a material sample according to claim 1 including raising the test plate relative to the liquid reservoir to a selected vertical position and analyzing the recorded images to calculate selected pore size (volume) characteristics.

10. In a method for testing predetermined absorbency characteristics of a material sample according to claim 9 including successively raising the test plate to create pressure changes on the material sample and determining the pore volume distribution.

11. In an apparatus for testing absorbency characteristics of a textile, paper or similar material sample comprising: (1) a liquid reservoir mounted on an electronic balance or load cell; (2) a liquid supply system for supplying a plurality of test liquid samples from a storage chamber in the liquid reservoir to a test liquid chamber; (3) a vertically movable test plate and actuator assembly for mounting of the material sample thereon; (4) a liquid conduit extending from the test liquid chamber to the test plate; and (5) a computer operatively connected to the electronic balance or load cell; the improvement comprising:

(a) a video camera mounted above and at a predetermined distance from the test plate and adapted to be vertically movable therewith, the video camera being operatively connected to the computer; and

(b) a computer program for analyzing recorded images from the video camera to make real time calculations of selected liquid absorbency and/or desorbency characteristics of the material sample.

12. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the test plate can be raised up to about 2.0 meters above the liquid reservoir.

13. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the apparatus is adapted to measure absorption of the material sample by lowering the test plate as the liquid in the test liquid chamber of the reservoir decreases in order to

maintain a constant head pressure, and to simultaneously calculate the orientation distribution function (ODF) of the recorded images.

14. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the apparatus is adapted to measure desorption of the material sample by raising the test plate relative to the test liquid chamber to a predetermined height above the reservoir to achieve a desired pressure, and to simultaneously calculate the orientation distribution function (ODF) of the recorded images.

15. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the apparatus can measure certain pore size characteristics by successively raising the test plate relative to the test liquid chamber of the reservoir to create pressure changes on the material sample, and simultaneously analyzing the recorded images to determine pore volume distribution.

16. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the material sample is a nonwoven fabric.

17. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the liquid is water or any other fluid.

18. In an apparatus for testing absorbency characteristics of a material sample according to claim 11 wherein the computer program for analyzing recorded images from the video camera resides in the computer operatively connected to the electronic balance or load cell and to the video camera.